NORTH PACIFIC OCEAN

By WILLIS E. HURD

Atmospheric pressure.—While in June, 1931, the Aleutian LOW was better developed than normal for the month, in July, on the average, the depression had largely filled, with barometer higher than normal, except over the northwestern part of the Gulf of Alaska, where it was slightly below. Such shallow northern depressions as occurred extended from near Kodiak northward across Alaska into the Arctic Ocean, the average barometer at Point Barrow being 29.84 inches.

The North Pacific HIGH on the average covered a wide expanse of the ocean, with a greatest north-south extent from the central Bering Sea to the Hawaiian Islands, and a greatest northeast-southwest extent from eastern Alaska almost to the lower islands of Japan.

The following table gives barometric data for several island and coast stations in west longitudes, including Point Barrow on the Arctic Ocean:

TABLE 1.—*Averages, departures, and extremes of atmospheric pressure at sea level, North Pacific Ocean and adjacent waters, July, 1931, at selected stations*

Stations	Average pressure	Departure from normal	Highest	Date	Lowest	Date
	Inches	*Inch*	*Inches*		*Inches*	
Point Barrow [1]	29.84	−0.08	30.26	1st	29.44	30th.
Dutch Harbor [1]	30.02	+0.08	30.30	4th	29.64	26th.
St. Paul [1 2]	30.00	+0.16	30.30	1st	29.66	24th.
Kodiak [1]	29.92	−0.02	30.20	4th [3]	29.42	17th.
Midway Island [1]	29.99	−0.12	30.10	11th [3]	29.80	7th.[3]
Honolulu [4]	30.01	−0.01	30.09	2d	[3] 29.90	31st.
Juneau [4]	30.05	0.00	30.43	5th	29.52	20th.
Tatoosh Island [4 5]	30.04	−0.04	30.45	3d	29.69	20th.
San Francisco [4 5]	29.84	−0.11	30.02	8th	29.67	24th.
San Diego [4 5]	29.81	−0.11	29.93	9th	29.69	24th.

[1] P. m. observations in averages; a. m. and p. m. in extremes.
[2] For 30 days.
[3] And on other date or dates.
[4] A. m. and p. m. observations.
[5] Corrected to 24-hour mean.

Cyclones and gales.—The month of July passed without the appearance of any important cyclones on our charts over any part of the North Pacific Ocean. Aside from one or two Aleutian disturbances of moderate depth, the deepest depression occurring in middle and upper latitudes passed over northern Japan on the 26th. No high winds, however, so far as known, occurred in its vicinity. Scattered gales, in no instance exceeding force 8, were reported on a few days from the 2d to the 11th along the upper routes. A fresh gale was experienced south of Honshu on the 9th, while off the upper California coast and thence for approximately 500 miles southwestward, gales of similar force were encountered on the 2d and 3d. In the last instance the cause was a sharp pressure gradient on the eastern slope of the oceanic HIGH abutting upon a LOW over southern California.

Conditions were quiet in the Asiatic Tropics, with only slight depressions occurring. Off the Mexican west coast the weather was considerably disturbed, with indications that at least four tropical depressions or cyclones of sufficient energy to cause known gales of force 8 or 9 were developed. Observations were too limited, however, to give more than meager information as to storm formation and movement. The only disturbance among them mentioned by the Mexican weather maps was that of the 21st to 24th or 25th, with some violence of wind and precipitation indicated, as the cyclone progressed northwestward and entered the coast through the Gulf of California. The gale notations, some of which appear in the table of gales, as gathered from our vessel weather reports, show the following: On the 3d, south of Acapulco, occurred the highest wind thus far reported for the entire ocean for the mouth—an east gale of force 9, accompanied by a barometer depressed to 29.55 inches. On the 10th, at the western extremity of the Gulf of Tehuantepec, a fresh north gale occurred, with pressure down to 29.66 inches. On the 21st a fresh southeast gale was reported south of Manzanillo, with but slight barometric depression. On the 23d, in 16° 55′ N., 101° 35′ W., a moderate southeast gale was experienced, with lowest pressure 29.59 inches. At 9 p. m. of the 25th the American steamship *Ensley City* reported a barometer reading of 29.39, and an hour later a maximum wind force of 7 from the southwest in 13° 20′ N., 96° 08′ W. On the 26th, between Acapulco and Salina Cruz, fresh gales from east-southeast and north-northeast occurred, with lowest reported barometer, 29.63 inches. In a report from the American steamship *La Perla*, the observer, Mr. J. Walton, said: "July 21 and 22: Unsettled weather conditions along the Mexican coast. The Weather Bureau at Mexico advised that a hurricane was moving along the coast."

Winds at Honolulu.—The prevailing wind direction at Honolulu was east, with a maximum velocity of 24 miles from the northeast on the 21st.

Fog.—Over practically the entire region lying between the fortieth and fiftieth parallels fog showed a slight to heavy increase over that of June, the percentage of its occurrence rising gradually from the American coast westward toward the Kuril Islands. Over most of the western half of the ocean within these latitudes at least 40 to 60 per cent of the days had fog. Fog lessened rapidly south of the fortieth parallel, disappearing mainly at 35° N., except along the American coast. From Eureka southward to the middle coast of Lower California it occurred on 25 to 30 per cent of the days.

BUCKET OBSERVATIONS OF SEA-SURFACE TEMPERATURES

By GILES SLOCUM

STRAITS OF FLORIDA AND CARIBBEAN SEA

The temperatures herein published are the means of the average temperatures for the four quarters of the month, except that, in the case of the 5° subdivisions of the Caribbean Sea, the figures shown are the simple means of the observed temperatures with the entire month taken as a unit. Table 1 shows the lengths of the quarters for each length of month.

Table 2 shows the average temperature for the Caribbean Sea and the Straits of Florida for July of each year from 1919 to 1930, inclusive, and Table 3 summarizes the temperature for the month in the same areas, including the departures of the July, 1930, means from the 11-year means for July, 1920–1930, and the changes from the temperatures for the preceding month of June, 1930.

The chart shows the number of observations taken during the month of July, 1930, within each 1° square; the mean temperature of the Straits of Florida, and of each 5° [1] subdivision of the Caribbean Sea; the 11-year means (1920–1930) for these areas; and the local mean time corresponding to Greenwich mean noon, at which time the mariners are instructed to make the temperature readings.

[1] In three cases, as indicated on the chart, the observations from small, little traveled, and unimportant areas at the outer limits of the Caribbean Sea have been treated as parts of contiguous 5° subdivisions.

There is usually a slight increase during July in the surface temperatures of the Straits of Florida and the Caribbean Sea. The average rise is greatest in the straits during the first part of the month, and in the Caribbean near its end. In both areas the rise is least in the middle half of July, at which time the average temperatures show practically no change from one quarter-month to the next. Both areas are warmest later in the summer, the peak monthly and quarter-monthly averages occurring in August or in September.

The northwestern portion of the Caribbean Sea is warmer in July than the southern and eastern parts, and the coolest water is that off the coast of Venezuela. There is thus, during this month, a roughly progressive increase of temperature in the Caribbean from east to west and from south to north.

The northwestern waters of the Caribbean, in addition to being the warmest, also show the greatest June to July rise in temperature of any portion of the sea, while the southern salient of the Caribbean, bounded on the north by the line extending from Gallinas Point, Colombia, to Cape Gracias a Dios, Nicaragua, and on the south by the continents, cools slightly from June to July. The rest of the sea shows little or no clearly defined temperature range between the two months.

TABLE 1.—*Lengths of "quarter-months" used in computing mean sea-surface temperatures*

Length of month	Days of month included in quarter			
	I	II	III	IV
28 days	1-7	8-14	15-21	22-28
29 days	1-7	8-14	15-21	22-29
30 days	1-7	8-15	16-22	23-30
31 days	1-7	8-15	16-23	24-31

In July, 1930, the Caribbean Sea had a temperature near to or somewhat below the seasonal average from the seventieth meridian eastward, and was warmer than average over the rest of the area. The general average temperature, inclusive of the entire Caribbean Sea, was above the 11-year mean. These above-normal temperatures in the Caribbean had now persisted since March, 1930, or for five consecutive months.

The temperature of the Straits of Florida was close to the average except during the first quarter of July, when the region was cooler than is usual so late in the season.

TABLE 2.—*Mean sea-surface temperatures in the Caribbean Sea and the Straits of Florida for July, 1919–1930*

Year	Caribbean Sea		Straits of Florida	
	Number of observations	Mean	Number of observations	Mean
		°F.		°F.
1919 [1]	88	81.4	18	82.4
1920	238	81.1	37	82.4
1921	277	81.2	68	82.6
1922	191	81.0	63	82.9
1923	358	81.2	89	82.8
1924	334	81.8	100	84.2
1925	552	81.5	121	83.2
1926	536	82.5	155	84.0
1927	654	82.2	226	83.9
1928	682	81.9	183	84.0
1929	723	81.6	202	82.1
1930	[2] 702	82.0	[3] 170	83.0
Mean (1920-1930)		81.6		83.1

[1] Not used in computations because of insufficient data available.
[2] Includes 7 intake readings.
[3] Includes 2 intake readings.

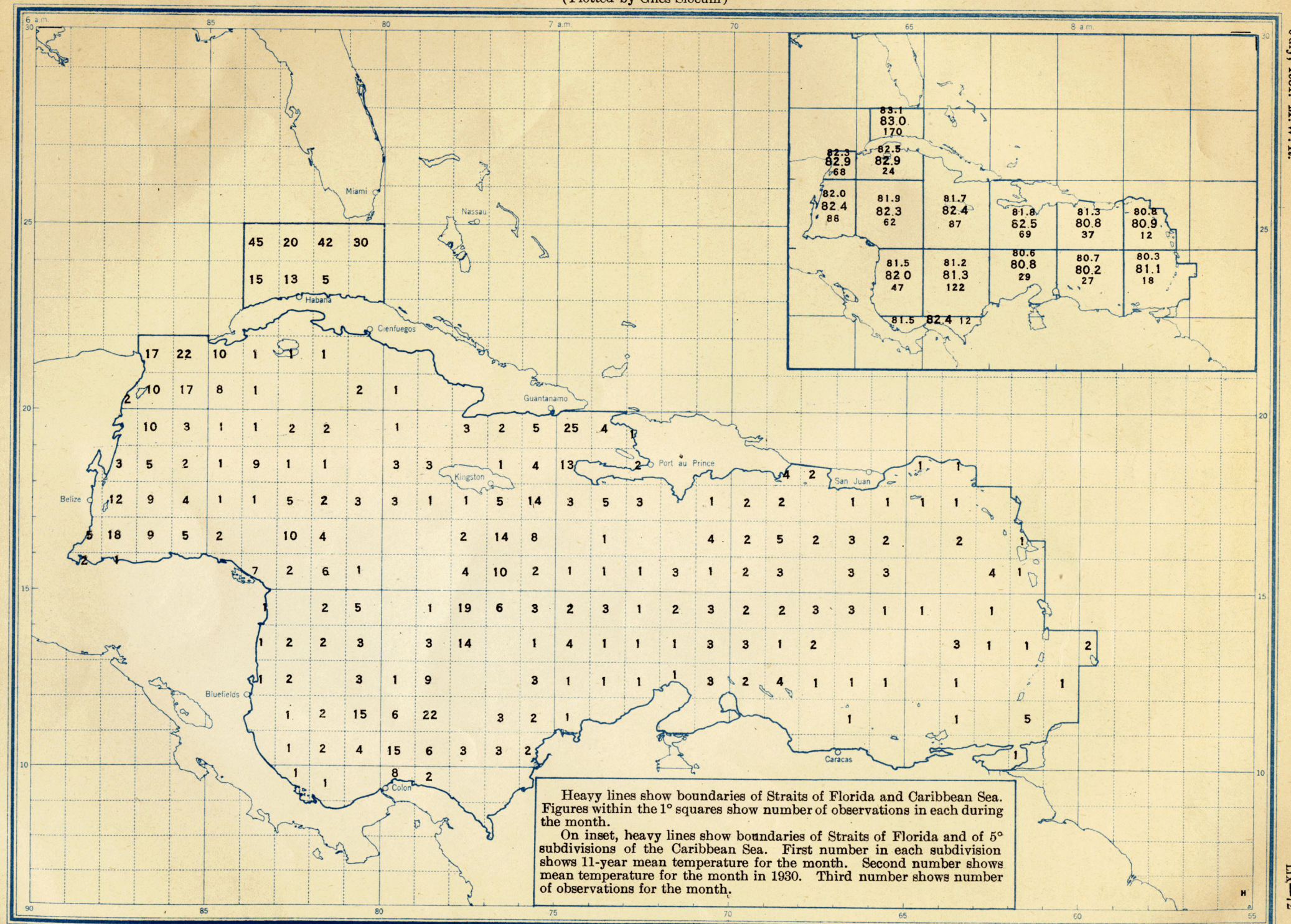
TABLE 3.—*Mean sea-surface temperatures (°F.), and number of observations, July, 1930*

Quarter	Period	Caribbean Sea				Straits of Florida			
		Number of observations	Mean	Departure from 11-year mean (1920-1930)	Change from preceding month	Number of observations	Mean	Departure from 11-year mean (1920-1930)	Change from preceding month
			°F.	°F.	°F.		°F.	°F.	°F.
I	July 1-7	161	81.8			37	82.3		
II	July 8-15	193	81.9			44	83.0		
III	July 16-23	170	82.2			50	83.2		
IV	July 24-31	178	82.0			39	83.3		
Month		[1] 702	82.0	+0.4	+0.5	[1] 170	83.0	−0.1	+2.6

[1] See notes 2 and 3, Table 2.

Distribution of Greenwich Mean Noon Bucket Observations of Sea-Surface Temperatures, July, 1930

(Plotted by Giles Slocum)



Heavy lines show boundaries of Straits of Florida and Caribbean Sea. Figures within the 1° squares show number of observations in each during the month.

On inset, heavy lines show boundaries of Straits of Florida and of 5° subdivisions of the Caribbean Sea. First number in each subdivision shows 11-year mean temperature for the month. Second number shows mean temperature for the month in 1930. Third number shows number of observations for the month.